described. Electro-convulsive therapy, with classical and brief stimulus techniques, is now given by this technique.

9. Twelve to fifteen electronarcosis treatments and an equal number of shock treatments can be given in three hours by one physician, one graduate nurse and two attendants. A small number of insulin patients can also be supervised during this period.

10. Electronarcosis is as safe as E.C.T. and safer than insulin therapy.

I would like to express appreciation to Dr. F. H. C. Baugh for his interest and permission to publish this paper, also to Dr. A. L. McKinnon, Dr. G. S. Burton and Dr. M. Bunt for their co-operation in preparing the case material.

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RÉSUMÉ

L'auteur rapporte environ 600 séances d'électro-narcose, les malades étant pour la plupart schizophrènes. Il administre le traitement au moyen de deux électrodes temporales. Un courant maximum de 300 milliampères permet d'abord de déclencher la crise clonique; on diminue alors l'intensité à 50 milliampères. Une fois la respiration rétablie, on maintient l'état d'électro-coma, pendant huit minutes, par un courant de 110 à 180 milliampères. Au début du traitement, le malade est anesthésié par l'injection intra-veineuse de 30 centigrammes de Pentothal sodique; une demi-heure auparavant, on lui a donné 1/100 de grain d'atropine. Ce traitement n'a pas causé de fractures dans les cas rapportés ici. Les états amnésiques et confusionnels qui suivant le traitement sont de peu d'importance et de durée, pourvu que celui-ci ne dure que 8 minutes. L'électro-coma peut s'accompagner d'arrhythmie cardiaque, d'hypertension artérielle, de vasodilatation cutanée, de transpiration et de signes neurologiques transitoires (Babinski, etc.). Le malade se réveille dans un délai de 2 à 35 minutes après la fin du traitement. Celui-ci n'est efficace que dans un certain nombre de cas de schizophrénie dont le début remonte à moins de 18 mois; quelques-uns de ceux-ci ont réagi favorablement à l'électro-narcose après avoir résisté à l'électro-choc. Par ailleurs, s'ils ont également résisté au choc insulinique, il n'est pas probable qu'ils se trouvent bien de l'électro-narcose. Cependant, les malades qui ont résisté à celle-ci pourront bénéficier du traitement par l'insuline.

PAUL DE BELLEFEUILLE

BASIC PRINCIPLES OF PÆDIATRIC ANÆSTHESIA*

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ANÆSTHESIA for infants and children does not differ radically from that in adults, as far as choice of agents is concerned: but there are several factors in technique which require special consideration. Constantly in the back of the mind of the anæsthetist is lurking the thought that the margin of safety in the child is much narrower than in the adult. Potent anæsthetic agents will snuff out life much more rapidly, respirations can be depressed with greater despatch, and the cells of the cerebral cortex can tolerate anoxia for a much shorter period. At the same time, one never ceases to wonder at the extent of surgery which these small bundles of humanity can withstand.

No matter what the agent or technique employed, one must always ensure that adequate oxygenation is maintained. The child should always receive 20% oxygen in the inhaled atmosphere, and preferably 25% or more. It is not enough merely to administer this adequate oxygen percentage: one must at all times be sure that the airway is completely patent so that the required oxygen will reach the alveoli and blood stream. Proper holding of the jaw will often be sufficient to preserve this airway, but frequently one requires the assistance of a pharyngeal airway or an endotracheal tube. Any degree of obstruction will produce a partial hypoxia.

The next important factor is that one should at all times avoid an increase of carbon dioxide in the system, for such an occurrence will speed the rapidity of breathing, will raise the blood pressure and pulse, and will produce a respiratory acidosis. This results in increased bleeding, a lessening of the reserve of the child, and strains the regulating mechanisms of acid-base balance in the body. One of the great factors leading to increased carbon dioxide in the system is the amount of rebreathing which a child is allowed to do. Even under an open drop mask, carbon dioxide will accumulate

* Presented at the Fall Meeting of the Montreal Medico-Chirurgical Society, October 21, 1948.
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fairly rapidly. This can be avoided by raising the mask off the face every few moments for several breaths; or the carbon dioxide can be blown off by running 2 to 3 litres of oxygen under the mask. A small face-mask contains upwards of 250 c.c. of dead space, and the danger of carbon dioxide build-up in this instance can only be avoided by running high flows of gases which will tend to keep the carbon dioxide constantly blown off.

Of great importance also in children is the fact that resistance to breathing, both inspiration and expiration, must be at a minimum. In modern gas machines there is always a certain amount of resistance which the adult can overcome without difficulty; but small children subjected to the same resistance easily become fatigued. Their respiratory muscles tire, they begin to breathe more rapidly and at the end of the operation they correspond to the individual who has run a long and desperate race.

Finally, special care must be taken in children to preserve a proper fluid balance during operation. It is just as important not to overload the circulation as it is to supply adequate replacements for the fluid lost. In all children under 2 years undergoing surgical procedures of any severity, it is a wise precaution to administer whole blood to replace that which is lost during the operation. A warning should be given concerning the undue administration of saline. The child's kidney is much less capable of dealing adequately with the excess amounts of saline than is the adult's. Overabundance of saline will produce water-logging of the tissues and early œdema. At the same time the water reserve of the child is less than that of an adult, and so he will more easily become dehydrated. When a child needs fluid, the solution of choice is believed to be 5% dextrose in water, provided there is no anæmia and the plasma volume is within normal limits. In a child receiving intravenous therapy, a rule of thumb which may be used as a guide is that 75 c.c. of fluid may be given for every pound of body weight over the 24 hour period. Special care must be taken not to give large amounts over short periods.

PREMEDICATION

The impressions which a child receives during his first sojourn in the hospital usually remain with him for the rest of his life. Therefore it is necessary that these impressions should be as pleasant as possible. We believe that the child should be admitted to hospital at least 24 hours before operation so that he may become accustomed to his surroundings. The question of premedication in children to lessen psychic trauma and reduce apprehension, is one on which all anæsthetists do not agree. However, in this hospital all children over 4 or 5 monhs of age are given an injection of morphine and scopolamine one hour preoperatively, according to the schedule laid down on the accompanying sheet (Table I). We are convinced that this allays fear and renders the patient more placid on arrival in the operating room. A particularly nervous child or one who is scheduled for spinal analgesia, is usually given in addition a dose of nembutal or seconal by mouth or rectum. The scopolamine is most effective in drying secretions, in reducing the tendency to spasm during induction, and in a synergistic way promoting the sedative effect of the morphine. Morphine is omitted in

TABLE I.
PREMEDICATION

Age	*Weight*	*Morphine with gr.*	*Scopolamine or gr.*	*Atropine gr.*
Up to 2 months	7 – 10 lb.	.....	1/600	1/400
2 – 3 months	10 – 12 lb.	.....	1/600	1/400
3 – 4 months	12 – 14 lb.	.....	1/600	1/400
4 – 7 months	14 – 16 lb.	1/144	1/600	1/400
7 – 11 months	16 – 19 lb.	1/120	1/600	1/400
11 – 18 months	19 – 24 lb.	1/108	1/600	1/400
18 months to 2 years	24 – 27 lb.	1/72	1/450	1/300
2 – 3 years	27 – 30 lb.	1/60	1/450	1/300
3 – 5 years	30 – 40 lb.	1/48	1/450	1/300
5 – 8 years	40 – 55 lb.	1/36	1/300	1/200
8 – 10 years	55 – 65 lb.	1/24	1/300	1/200
10 – 12 years	65 – 80 lb.	1/18	1/200	1/100
12 – 14 years	80 – 90 lb.	1/12	1/150	1/75
Adult	90 lb. and up	1/8 – 1/4	1/150 – 1/100	1/75

infants under four months because of its depressant effect on respiration.

One potent objection to premedication is that the child must have a needle pushed into him. It is of interest to note that the hypospray, an instrument whereby subcutaneous or intramuscular injections can be performed painlessly, will be available for use within 2 to 3 months. It holds promise of being a great boon in all phases of pædiatrics.

INDUCTION OF ANÆSTHESIA

In keeping with the ideal of avoiding any noxious impressions of hospitalization, induction of anæsthesia should be pleasant and devoid of force. This is not always easy. But if one can establish a liaison with the child, drawing him into conversation about his home or school life, *i.e.*, familiar environments, he will often drop off to sleep without fear or struggling. Nitrous oxide is a particularly good agent for induction. It is an odourless gas and because it is one and a half times as heavy as air, induction can be commenced with the mask raised well off the face. By the time the mask is gradually lowered to cover the mouth, the patient is asleep.

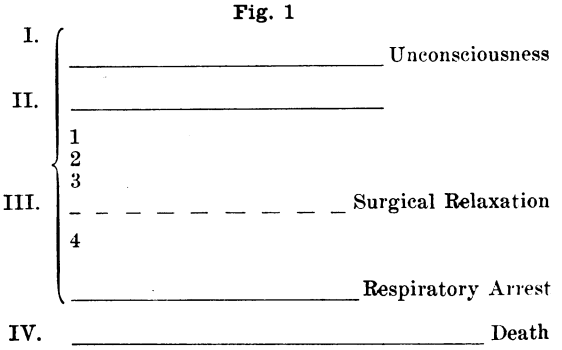
Vinyl ether, or vinethene, is a very potent and yet relatively safe agent which is used commonly for induction. Its odour is not especially unpleasant, and usually 3 or 4 good breaths will render a patient unconscious. It is thought to be definitely superior to ethyl chloride, which is not as safe because of its narrow margin between respiratory arrest and cardiac arrest.

In older children induction with pentothal or kemithal, a similar rapid-acting barbiturate, is frequent. Patients coming repeatedly to the operating room often prefer this method of induction.

Ether.—Ethyl ether is still the safest anæsthetic known. Perhaps one can explain this by a glance at the accompanying chart (Fig 1). With ether surgical relaxation is reached in the third plane of the third stage of anæsthesia when respiratory exchange is adequate and the patient is still at an intermediate station on his journey between unconsciousness and death. Even if anæsthesia is carried to respiratory arrest, there still remains a sizable interval before cardiac arrest occurs and death ensues. This happy combination of factors is not present with other agents when used singly.

On the other hand, one should remember that ether tends to produce an acidosis, temporarily depresses liver function, is responsible for an

Fig. 1



oliguria, and causes nausea and vomiting in about 60% of the patients in whom it is used. Its explosive properties, when used with oxygen, should not be forgotten.

Nitrous oxide.—Nitrous oxide is a most valuable agent in pædiatric anæsthesia, providing one is aware of and does not abuse its limitations. It is one of the weakest anæsthetics known, but at the same time is a potent analgesic. Used alone with adequate oxygen one can rarely get below the second stage of anæsthesia. By itself it is not capable of producing surgical relaxation. Its value lies in the fact that it disturbs the body metabolism less than any other agent, and that it serves as a powerful analgesic force when used in combination with other agents.

Cyclopropane.—This agent, discovered by Lucas and Henderson in Toronto, is probably used more frequently in adults than in children. Economy limits its use to the closed absorption technique, except in the smallest infants, and this closed absorption technique has disadvantages in children, as will be explained later. It is a powerful respiratory depressant, and surgical relaxation is obtained relatively close to the end of the journey described above. However, children tolerate this agent well, and it is usually the agent of choice in intrathoracic procedures where respirations can be artificially aided by the anæsthetist.

It should be borne in mind that cardiac arrhythmias are not infrequent with this agent when it is used in too high a concentration. Adrenalin should never be injected when a patient is anæsthetized with cyclopropane, for this in a large percentage of cases leads to

ventricular tachycardia, which goes on to ventricular fibrillation and cardiac arrest. With this agent also, one should not forget its explosive properties.

I. V. Barbiturates. — If properly handled, there is no contraindication to the use of pentothal or kemithal in children. It should be emphasized, however, that these agents are primarily hypnotics and only exert an analgesic effect by virtue of the depth of hypnosis induced. For this reason they should be used only in combination with analgesic agents, such as nitrous oxide and cyclopropane, or with some type of regional analgesia. In this hospital pentothal is used in 2.5% solution. Any tendency to depression of respiration, which leads to anoxia and carbon dioxide build-up, is counteracted by manual supplementation of respirations.

TECHNIQUES OF ADMINISTRATION

As ether is one of the safest and widely used anæsthetics in children, so the vaporization and inhalation of this agent through the medium of some type of mask has been one of the commonest methods of administration. When this technique is chosen, it is of benefit to run a flow of 2 to 3 litres of oxygen under the mask by means of a mouth hook. This lessens the danger of hypoxia developing and also tends to blow off the carbon dioxide which may accumulate beneath the mask.

With this or any other method, preservation of a patent non-obstructed air passage is most essential for the well-being of the patient. Difficulty in maintaining an adequate airway over the passing years has led to the introduction and frequent use of the endotracheal tube. The advantages of endotracheal intubation are several: (1) An adequate patent airway is assured at all times. (2) Operations in the region of the head and neck can be conducted with perfect safety to the patient. (3) The tracheo-bronchial tree may be suctioned out with ease at any time. (4) Patients may be carried in lighter and more even planes of anæsthesia because the danger of laryngospasm resulting from potent surgical stimuli is eliminated. This is especially true in intra-abdominal procedures. (5) It allows adequate control of lung ventilation during intra-thoracic procedures.

The disadvantages of endotracheal intubation in children are the occasional hoarseness and laryngeal œdema which are seen post-operatively. It is believed that these complications are due largely to trauma of intubation and to coughing or bucking on the tube after it is inserted. These occurrences can be largely overcome by waiting until the patient is well anæsthetized before proceeding to intubate. In the last fiscal year at this hospital 48% or 1,363 children coming to the operating room were intubated. Of this number, 6 developed acute laryngitis, and 6 developed œdema of the glottis postoperatively. One of these patients required tracheotomy. In the same period, during which 2,756 anæsthetics were administered, only 2 patients developed postoperative pneumonia. We believe firmly that the advantages of intubation outweigh the disadvantages.

Before leaving this subject one should mention the vinyl plastic portex endotracheal tube which was developed during the war, in England. This is a flexible tube which moulds easily at body temperature without sacrificing its lumen. It does not kink easily and we believe is less prone to cause trauma and post-operative complications than the more prevalent rubber tubes.

Procedures employing the gas machine are used frequently in children. The closed carbon dioxide absorption technique should be used with caution under 6 years of age and only in special circumstances under 4 years of age, because the amount of resistance in the system is more than the child can tolerate without undue fatigue developing. A partial rebreathing system has little resistance for the child to overcome, but unless large flows of gases are used (5 to 8 litres per minute) carbon dioxide will build up in the system, to the detriment of the patient. A non-rebreathing system has been evolved at this hospital which is believed to maintain the patient as close as possible to the physiological normal. The gases flow into a reservoir bag and between this and the endotracheal tube are two valves arranged in such a way that the patient can inspire only from the bag, and his expirations are blown off into the atmosphere. The valves are rubber and of such a construction that they provide minimal resistance in the circuit. It is virtually impossible to accumulate any carbon dioxide as the

dead space is reduced to a very small amount. Babies a few days old have been anæsthetized for 2 to 3 hours using such a system without undue fatigue. Nitrous oxide and oxygen in a 75:25 ratio, with small added amounts of ether vapour, are the agents used with this non-rebreathing technique. If no machine is at hand, a draw-over system using a Flagg ether bottle is efficient in maintaining anæsthesia.

Rectal Anæsthesia

Avertin and pentothal by rectum are used not infrequently for "basal anæsthesia" by which is meant a condition of unconsciousness usually induced prior to the patient coming to the operating room. This type of anæsthesia has much to recommend it in pleasantness from the patient's viewpoint, but it is not devoid of danger. A given dose of agent may have too profound an effect, with consequent respiratory depression or obstruction developing. Moreover, many patients receiving basal anæsthesia sleep for considerable periods following operation, thus requiring most careful watching. In selected cases basal anæsthesia may be of extreme value.

Spinal Analgesia

The use of spinal analgesia in children is not without danger, but occasionally it becomes a method of choice. Within the past year in this hospital a series of some 125 cases have been anæsthetized using dilute hypobaric pontocaine solution, in which 1 c.c. of solution contains 1 mgm. of pontocaine. The dosage used is ½ mgm. per year of age and the technique is that of Etherington-Wilson, somewhat modified. To date the results with this dilute agent have been most satisfactory, but the investigation is not yet sufficiently complete to say whether this is a technique which is safe under all circumstances. In order to avoid unnecessary psychic trauma, patients are usually kept asleep during the operative procedure with nitrous oxide or small amounts of an intravenous barbiturate.

There is no definite contraindication to the use of other regional procedures in the child, if they are to be of benefit. For example, brachial blocks, caudal blocks, stellate blocks, lumbar sympathetic blocks and others are performed when the occasion arises.

Curare

The introduction of curare into clinical anæsthesia by Dr. H. Griffith, of Montreal, is proving to be one of the great advances of modern anæsthesia. Indications for its use in children are not as many as in adults, but it is most effective in producing muscle relaxation when required. It is safe, providing one has adequate means of artificial ventilation at hand. As a guide for dosage in children, one may use 0.5 unit per pound of body weight. If it is used in conjunction with ether anæsthesia, the total dose must be reduced by two-thirds. The reason for this is that ether itself exerts a direct paralyzing effect at the myoneural junction.

Anæsthesia for tonsillectomy and adenoidectomy.—It has been stated that the administration of an anæsthetic should never be considered a minor procedure. This point should certainly be emphasized as far as anæsthesia for tonsillectomy and adenoidectomy is concerned. This is probably the commonest operative procedure in children, and yet one which is fraught with great dangers from the anæsthetic viewpoint. The maintenance of a smooth plane of anæsthesia, the avoidance of aspiration of blood, with its deleterious postoperative complications, and the preservation of a well-oxygenated patient can only be accomplished with certainty by means of an endotracheal tube. The anæsthetic agent is of lesser importance, but it is the practice here to induce the patients with open drop vinethene followed by ether. After intubation they are carried on nitrous oxide-oxygen and ether from the machine or on ether and air using the Flagg bottle. This latter is a convenient method where all facilities are not available. The non-rebreathing valve as described earlier is used to avoid rebreathing. The otolaryngologist soon becomes used to the presence of the tube and does not find it in his way.

Anæsthesia for intra-abdominal procedures.—There are many methods and agents which may be employed for these operations. Muscular relaxation is a necessity for the surgeon, and may be achieved in several ways. Open drop ether anæsthesia is widely employed and is satisfactory. However, in the severely ill, toxic, dehydrated patient, with acetone in the urine, large amounts of ether will tend to increase the dehydration and tendency to acido-

sis. In such cases, the amount of ether used can be reduced by intubating the patient and carrying him on nitrous oxide, oxygen and ether, using the non-rebreathing valve. The nitrous oxide assists materially in promoting analgesia and the intubation allows one to supply adequate relaxation in a lighter plane of anæsthesia. Good operating conditions can also be obtained by using a combination of pentothal, nitrous oxide, oxygen and curare, or by using cyclopropane, with curare added if required. At times spinal anæsthesia is the method of choice.

Anæsthesia for recent fractures.—This is a condition which frequently requires treatment in children, and again is one which may be handled in several ways by the anæsthetist. It is important to know how long before the accident the child had a full meal. For it is well-established that the functions of digestion almost invariably cease at the time of trauma. Full stomachs have been found as long as nine hours after the accident. If it is suspected that the child has a full stomach, the hazards of anæsthesia are increased considerably. In such cases the method of choice is probably some type of regional block which may be given while the child is heavily sedated or asleep with nitrous oxide. Alternatively, the stomach may be washed out before anæsthesia, or anæsthesia may be rapidly induced and the patient intubated to avoid possible aspiration of vomitus.

Nitrous oxide alone seldom provides sufficient relaxation to reduce fractures, and should be supplemented with an intravenous barbiturate or small amounts of ether.

Anæsthesia for hare-lips and cleft palates.—Endotracheal intubation in these cases is essential for the same reasons as outlined in discussing tonsillectomies. They can be carried in a light plane of anæsthesia and kept close to the physiological normal using the non-rebreathing valve, with nitrous oxide-oxygen and small amounts of ether as agents.

Anæsthesia for dental extractions.—The use of nitrous oxide alone for dental extractions in children has not been satisfactory because adequate analgesia has been obtained only by reducing the oxygen concentration to dangerously low levels. In the quest for a supplementary agent from which the patient would recover rapidly without ill effect, our attention was directed to the anæsthetic, trichlorethylene, which has been employed for several years in England. This is a potent drug, producing a high degree of analgesia in low concentrations. When used as an adjunct to nitrous oxide, the patients are effectively anæsthetized without suffering from oxygen lack, and at the same time recover quickly and quietly from the procedure. Trichlorethylene, or trilene as it is called, is a liquid with a sweet chloroform-like odour, and may be substituted for ether in the bottles provided on the gas machines. One must emphasize strongly that this agent should never be used in a carbon dioxide absorption system, for the drug reacts chemically with the soda lime to produce a compound which may cause permanent neurologic damage or death to the patient.

Anæsthesia for infant surgery.—Included in this group are operations for pyloric stenosis, tracheo-œsophageal fistula, congenital bowel obstruction, diaphragmatic hernia, and congenital cystic disease of the lung. It is felt that the child less than one month old is not as sensitive to painful stimuli as older children, and thus requires less anæsthesia to produce satisfactory operating conditions. For this reason most of these infants can be carried adequately on nitrous oxide-oxygen in a 75:25 ratio with traces of ether added. While more control of the situation is possible if an endotracheal tube is in place, this is not always necessary.

Anæsthesia for intrathoracic surgery.—Operations for congenital cardiac defects and for lobectomy and pneumonectomy are becoming more frequent. These are major anæsthetic problems which in this hospital have been handled for some years by the use of cyclopropane and oxygen in the closed to-and-fro absorption circuit. Absorption canisters are used which approximate the tidal volume of the patient and these are changed frequently (every 10 to 20 minutes) to avoid any carbon dioxide accumulation. It is usual to mechanically aid and support the patient's respirations during the procedure. This increases their oxygen exchange, makes the process of respiration less fatiguing for them, and improves operating conditions for the surgeons by lessening the vigour of diaphragmatic movements. More recently a continuous drip of 0.2% procaine has been used in the belief that it may render

the cardiac musculature less irritable to abnormal stimuli. To date we have not been convinced of its value in the dilution used.

OXYGEN THERAPY

Finally, a word should be said concerning postoperative oxygen therapy in the wards. Since the introduction of the Beckman Oxygen Analyser, it has been possible to determine easily and quickly the exact oxygen percentage of any desired atmosphere. As a result, it has been shown repeatedly that in oxygen tents it is rare to find an oxygen percentage above 45%. This may be due to the relatively large space in the tent, to inefficient utilization, or to the fact that it is necessary to open the tent frequently. If a tent is used, a flow of at least 10 litres per minute must be used, and the tent interfered with as little as possible.

On the other hand the small plastic tent for infants is of considerable value. If flows of 8 to 10 litres per minute are used, and if the edges are properly packed, percentages of 80 to 90 are commonly found. Ice should not be used in these small tents, as the infant's temperature is usually low on return from the operating room, and there is no advantage in breathing cold oxygen. Proper humidification is obtained during passage from the tank to the tent.

In older children the naso-pharyngeal catheter is found to be quite useful. An ordinary urethral catheter with several holes in the end is placed in the nose a distance which is measured from the tip of the patient's nose to the tragus of his ear. If he tends to swallow on the catheter after it is introduced, it is withdrawn slightly. Before insertion the tube is coated liberally with nupercaine ointment. The children tolerate these catheters without discomfort. A flow of 3 to 5 litres per minute provides 60 to 70% oxygen in the inhaled atmosphere.

In 2,000 years, there will be "standing room only" on earth if the population continues to increase at the present rate of about 2,000,000 a month. Dr. Brock Chisholm, director general of the World Health Organization, made this prediction at the meeting of the American Association for the Advancement of Science.

ALBERTA'S TUBERCULOSIS PROGRAM*

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ALBERTA was the second Province in Canada to provide free sanatorium treatment for its residents. Its tuberculosis death-rate is the third lowest, being lower in Saskatchewan and Ontario.

The Tuberculosis Act of 1936 authorized free sanatorium treatment and free diagnosis for residents irrespective of their economic status, with the cost being borne by the revenue of the Province. The Act is administered by the Division of Tuberculosis Control of the Department of Public Health, with headquarters at the Central Alberta Sanatorium, Calgary. A sub-office and clinic is located at present in the General Hospital in Edmonton.

ORGANIZATION

While the treatment and diagnostic facilities are the immediate responsibility of the Division of Tuberculosis Control, three other major organizations co-operate extensively in the anti-tuberculosis work:

1. The Provincial Government provides: (*a*) free treatment; (*b*) free diagnosis.

2. The Alberta Tuberculosis Association: (*a*) assists in diagnosis; (*b*) provides a rehabilitation service; (*c*) fosters education and publicity.

3. The Indian Affairs Branch (Federal) provides: (*a*) free treatment for Indians; (*b*) free diagnosis for Indians.

4. The Department of Veterans' Affairs (Federal): (*a*) maintains pensioners in the Provincial and the Charles Camsell Sanatoria; (*b*) conducts a rehabilitation and follow-up service.

The Central Registry keeps records of known cases of tuberculosis, deaths, contacts, and suspected cases. These are classified alphabetically and by municipalities, and from these, clinic schedules and other control efforts are prepared.

OBJECTIVES IN CONTROL MEASURES

(1) Modern treatment of active cases. (2) Diagnosis: (*a*) Clinic examination of ex-patients, contacts and suspects; (*b*) x-ray surveys of the general public by mobile units; (*c*) assistance in diagnosis to practising physicians. (3) Edu-

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* Read at the Alberta Medical Association meeting, Calgary, September 24, 1948.